

REMARKS

Pending in the application are claims 1-47, of which claims 1, 8, 18, 23, 31, 34, 37, 41, 43 and 45 are independent. All of the pending claims are rejected. None of the claims is currently amended, however the claims are listed above for the convenience of the Examiner. The following comments address all stated grounds for rejection and place the presently pending claims, as identified above, in condition for allowance over the cited references.

Claims 1-5, 8-10, 12-15, 18-20, 23-25, 27-28, 31-36, and 41-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paulsson in view of Hademenos. Paulsson describes an electromagnetic seismic source with clamping means, and Hademenos describes a linkage-arm for forcing a tool against a borehole wall, i.e., another clamping means. The Office states that “it would have been obvious to one of ordinary skill in the art to combine the teachings of Hademenos to use variable angle pushing rods with the source of Paulsson for the purpose of connecting the source to the borehole in simplistic and rigid manner.”¹ Applicant respectfully traverses. It appears that there is a fundamental misunderstanding about the subject matter of the invention. The presently claimed invention is directed to generating acoustic disturbances for logging operations, not clamping means for connecting the tool to the borehole wall. Note, for example, the preamble of claim 1 which recites “an acoustic borehole source for generating elastic waves through an earth formation.” The Office may wish to perform a new search based on the subject matter recited in the claims. If so, the next action cannot properly be a final rejection.

Assuming the Office will argue that some combination of the clamping means of the cited references could be used as an acoustic source, Applicant will now explain why the cited combination fails to suggest a practical acoustic source as recited in the claims of this

¹ 3/30/2007 Office Action at pp. 2-3

application. With regard to all of the independent claims, the Office suggests that Paulsson shows pads (66) which, when actuated via pushing rods (64), generate elastic waves. However, as described at column 2, line 66 through column 3, line 13, elements (64) are not pushing rods, but rather “hydraulic pistons” which are part of hydraulic clamping means (60). Paulsson does describe a reaction mass (42) parallel to the borehole for vibrating in the vertical direction to cause vertical shear waves.² However, reaction mass (42) is not part of the clamping means (60), and therefore is not operationally connected with the hydraulic pistons (64). In other words, the axial force of the reaction mass is not translated into a radial force via pads. Consequently, much of the acoustic energy generated by the reaction mass (42) will remain in the borehole as tubewaves, as described in the Background of the present application at paragraphs [0003-0007]. Withdrawal of the rejections of claims 1, 8, 18, 23, 31, 34, 37, 41, 43 and 45 is therefore requested.

Additional distinctions are recited in each of claims 8, 23, 34, 37, 43 and 45. In particular, these claims recite multiple motorized reaction masses which actuate the pads via pushing rods. Because each of the pushing rods is connected to a reaction mass, none of the pushing rods pivot around a fixed position relative to the tool body. In contrast, all embodiments of Hademenos have the arm fixed at one end of the tool, e.g., end (72, Fig. 5). An advantage of the claimed configuration is that the pushing angle can be changed to enhance propagation, as described in the Specification at paragraphs [0035-0036]. In particular, the angle at which the force is imparted against the casing can be selected by controlling the motorized reaction masses to change the pushing rod angle with respect to the casing, whereas the cited combination would have a fixed angle. Further, the claimed invention can achieve additional enhancements by changing the phase differential between the motorized reaction masses, as described in the Specification at paragraphs [0035-0036].

² Column 3, lines 54-62

These features enable production of different wave types which would not be possible with the cited combination, even assuming the clamping features were somehow suitable for generating acoustic disturbances.

Claims 2-5, 9-10, 12-15, 19-20, 24-25, 27-28, 32-36, 42 and 44 are dependent claims which further distinguish the invention, and which are allowable for the same reasons as their respective base claims. Withdrawal of the rejections of these claims is therefore also requested.

Claims 6-7, 11, 16-17, 21-22, 29-30, 37-40, and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paulsson in view of Hademenos and further in view of Sakata. The Office cites Sakata as teaching use of particular reaction mass weight and stiffness to achieve a desired radiation energy, frequency bandwidth or resonance frequency. However, the cited passage fails to support the assertion. In particular, column 4, lines 11-13 of Sakata describes driving the mass at any desired frequency, but fails to mention selection of weight or stiffness to achieve a radiation energy, frequency bandwidth, resonance frequency, or any other desired result. Withdrawal of the rejections is therefore requested.

Conclusion

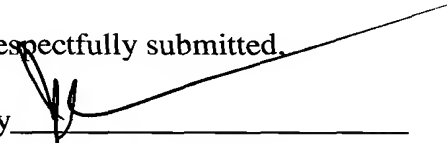
In view of the above, each of the presently pending claims in this application is believed to be allowable over the cited references. Accordingly, the Examiner is respectfully requested to pass this application to issue unless a new search is to be performed.

Applicant believes no additional fee is due with this response. However, if a fee is due, please charge our Deposit Account N°. 19-0615, under Order No. 60.1543 from which the undersigned is authorized to draw.

Dated: June 27, 2007

Respectfully submitted,

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